



### Treasures of Bharatiya Maths

Three BIG Ideas
Jonathan J. Crabtree

Virat Hindustan Sangam Karnataka VHS 13 August 2021











# The First BIG Idea?

## Rebuild Maths from Zero











# The Second BIG Idea? Teach Better Bharatiya Maths!









### The Third BIG Idea?

Become an Economic Superpower









# The First BIG Idea?

## Rebuild Maths from Zero







#### An example of the detailed research that went into the development of Podometic™ Bharatiya Maths



### Examples of some languages reviewed by elementary mathematics historian Jonathan J. Crabtree, Founder of www.podometic.in (Post Vedic Maths)

888	Greek	άριθμὸς άριθμὸν πολυπλασιάζειν λέγεται. ὅτ'αν ὅσαι εἰσιν ἐν αὐτῶι μονάδες τοσαυτάκις συντεθῆι ὁ πολλαπλασιαζόμενος καὶ γένηταί τις	
950	Arabic	بوجد أحد العددين بعدد أحاد العدد الآخر فيكون حصة الواحد من أحاد المضروب هي المضروب فيه بعينه والمجموع هو العدد الحاصل من ضرب العدد	Į.
1482	Latin	Numerous per alium multiplicari dicitur, qui totiens sibi coacervatur, quotiens in multiplicante est unitas.	
1543	Italian	Quel numero se dice esser multiplicato per un'altro, il quale si e assunato tante volte, quante unita e in lo multiplicante.	
1555	German	Ain zal multiplicirt oder meret ain andere / wann die ander / als offt die erst zal ains in jr beschleüßt / genommen vnd zuesamen bracht wirdt.	1
		multiplicirt oder meret die zal 7. wann die zal 7. vier mal / in ansehen das ains in 4. viermal begriffen ist / genommen vnd zuesamen bracht wir	1
1565	French	Un nombre, se dict multiplier un autre nombre, quand autant d'unitez, qu'il y a en luy, autant de fois se compose le multiplie, & en naist un au	t
1570	English	A number is sayd to multiply a number, when the number multiplyed, is so oftentimes added to itselfe, as there are in the number multiplying	1
		and an other number is produced.	
1665	Spanish	Un número se dice multiplicar á otro quando tantas veces estuviere compuesto el que se multiplica, quantas fueren las unidades del multiplica	1
		producto fuere algun número.	
1695	Dutch	Een getal segt men een getal te vermeenigvuldigen, als dat soo meenigmaal een saamgeset getal is, dat vermeenigvuldigt word, als 'er eenhede	
		vermeenigvuldigende sijn, en dat 'er eenig getal voortkomt.	
1719	Sanskrit	गुण्याङ्कगुण्काङ्कयोर्घातो गुणनफलं क्षेत्रफलं भवति	
1855	Swedish	Ett tal säges multiplicera ett tal, när det sednare talet tages så många gånger, som enheter finnas i det förra, och ett annat tal (produkten) dera	1
		uppkommer	
1857	Chinese	乘數者,數有若干倍,即若干為乘數。面數者,兩數相乘所得,原兩數為其邊。	
1865	Hungarian	Szám számot szorozni mondatik, midon a hány egység van benne, annyiszor rakatik a szorzandó, és igy származik szám.	
1907	Czech	Pravíme, že číslo číslem se násobí, když násobené (násobenec) tolikrát se složí, kolik v druhém jest jednotek, a nějaké vznikne.	
1912	Hebrew	וי במספר אחר הוא המספר הנכפל פעמים אשר מנינם כמנין האחדים אשר במספר השני אשר הוא נמנה בו, כמו שתי פעמים שלש או שתי פעמים עשרה	:
		וספר שטוח וזו צור תו::: והמספר הנקבץ מהכפל הזה יקרא מספר שטוח	2
1912	Danish	Et Tal siges at multiplicere et Tal, naar det, som multipliceres, lægges sammen ligesaa mange Gange, som der er Enheder i det første, og et eller	
		frembringes.	
1949	Russian	Говорят, что число умножает число, когда сколько в нем единиц, столько раз составляется умножаемое и что-то возникает.	(





#### ●P.1 1 अय धनर्णशून्यानां सङ्कलनम्। 2 धनयार्धनमृणमृणया-3 र्धनर्णयोरन्तरं समैक्यं खम्। 4 ऋणमैक्यं च धनमृणध-5 नशून्ययोः शुन्ययोः शून्यम् ॥ ३०॥ (३१) धनयारैक्यं धनमृष्ययारैक्यमृणं भवति । धनणेयारक्तरमेवैक्यं भव-ति । समयोर्धनर्णयोरैक्यं खं शून्यं भवति । ऋषशून्यये।रैक्यमृणं धनशू-न्ययोरैक्यं धनं श्रन्ययोरैक्यं च श्रन्यं भवति । स्त्रीपपस्पर्धे मन्मुद्रिता भास्करबीजिटिप्पणी द्रष्ट्रच्या ॥ ३० ॥ इदानीं व्यवकलनमाइ। जनमधिकाद्विशोध्यं धनं धनादृणमृणाद्धिकम्नात्। ब्यस्तं तदन्तरं स्याद्दणं धनं धनमृणं भवति॥३१॥(३२) शुन्यविहीनमृणमृणं धनं धनं भवति शून्यमाकाशम्। शोध्यं यदा धनमृणाहणं धनाहा तदा चेप्यम्॥३२॥(३३) अधिकाद्वनादूनं धनं विशेष्धं शेषं धनं भवति । अधिकादृणादु-16 नमृषं विशोध्यं शेषमृषं भवति । जनाहुनादिश्वकं धनं वे।नादृषादिधिक-17 मृणं विशोध्यं तदा तदन्तरं व्यस्तं विपरीतं स्यात् । अर्थादधिकं धनं वि-18 शाध्यं तदा शेषमृणं भवति । श्रीधकमृणं विशोध्यं तदा शेवं धनं भव-19 ति । कयं विपरीतं भवतीत्याद । ऋणं धनं भवति धनं चर्णं भवतीति। 20 चेद्रुणं शुन्यविहीनं शुन्येन विहीनं तदा चर्णा धनं च शून्यविहीनं धनं शून्यं 21 च शून्यविहीनमाकाशं शून्यं भवति । यदि ऋणाद्भुनं शोध्यं वा धनादृष्यं 22 शोध्यं तहा चेप्यमयात् तदा तयायाग एवान्तरं भवतीति। अत्रापपन्यथे मन्मुद्रिता भास्करबीजिंडप्यगी विसाक्या ॥ ३१-३२॥

24 रदानीं गुणने करणसूत्रम् । P.2	6
25 ऋणमृण्यनयाचाता धनमृण्याधनवधा धन भवति।	
26 शून्यर्थयोः खघनयोः खशून्ययोषी वधः शून्यम्॥ ३३॥(३४)	
27 च्याधनयोघात च्यां भवति । च्यायार्वधा धनवधा धनयार्वधाच	
28 धनं भवति । शून्यर्णयोः खधनयोः शून्यधनये।वा खशून्ययोश्च वधः शून्यं	
29 нап и за и	
30 इदानीं भागहारे करणसूत्रं वृत्तद्वयम् ।	
31 धनभक्तं धनमृण्हतमृणं धनं भवति खं खभक्तं खम्।	
32 भक्तमृणेन धनमृणं धनेन हृतमृणमृणं भवति॥३४॥(३५)	
33 खेाडृतमृषं धनं या तच्छेदं खमृणधनविभक्तं वा।	
34 ऋषधनयोर्वर्गः स्वं खं खस्य पदं कृतिर्यत् तत्॥ ३५॥(३६)	
35 धनं धनभक्तं वा ऋषं ऋषभक्तं फर्न धनं भवति । खभक्तं खं	
36 फलं खं भवति । ऋणेन धनं भक्तं फलमृत्यं स्थात् । धनेन ऋगं हृतं फल-	
37 मृणं भवति । ऋणं वा धनं खेने। हुतं तच्छेदं तस्य शूत्यस्य हिदा यिस-	
38 चृषो वा धने तच्छेदं भवति । एवं खं शून्यमृषाधनविभक्तं (शून्यं) वा त-	
39 च्छेदं भवति । फर्न श्रून्यं भवति वा श्रून्यं तद्वरं स्थादित्यर्थः । ऋषधनः	
40 यावेगीः स्वं भवति । खस्य वर्गः स्वं भवति । तदेव वर्गस्य पदं भवति	
41 यत्कृतिः स एव वर्गा भवेदिति । भास्करबीजेऽप्येतदेव सर्वम् । ग्रत्र	
42 स्मक्तं समर्थात् है इदं सर्वदा शून्यसमं नेत्येतदचे चलनकलनं विला-	
43 क्यम् ॥ ३४-३४ ॥ । जीव लेकि लेकि लेकि एक क्रिकेट क्य	
44 इदानीं सङ्क्षमणविषमक्रमीह।	
45 योगोऽन्तरयुतहीने। बिह्नतः सङ्गमणमन्तरविभक्तं वा।	
46 वर्गान्तरमन्तरयुतहीनं बिहृतं विषमकर्म ॥ ३६॥(३७)	
47 योगी राश्योवींगेऽन्तरेख राश्यन्तरेख युत्ती हीनश्च द्विद्वती दिन	
48 तो राशी स्तः। इदं सङ्क्षमणं नाम गणितम्। वा राश्ये।वैगान्तरं राश्य-	6
49 न्तरेश विभन्तं फलमन्तरेश युतं हीनं द्विहृतं च राशी स्तः। इदं विष-	

# Brahmagupta's 18 Sūtras of Symmetry -598 - 668 CE

Ch. 18

Brāhmasphuţasiddhānta 628 CE

Crabtree's Brahmagupta by AFX Animation Kolkata, India.

www.podometic.in/vhs-talk

### Brahmagupta's 5 Addition Sutras

धनयोधनम्ऋणमृणयोः धनर्णयोरन्तरं समैक्यं खम् ऋणमैक्यं च धनमृणधनशून्ययोः शून्ययोः शून्यम्

**AS1** positive plus positive is positive

0

- **AS2** negative plus negative is negative
- positive plus negative is the difference between the positive and negative
- **AS4** when positive and negative are equal the sum is zero

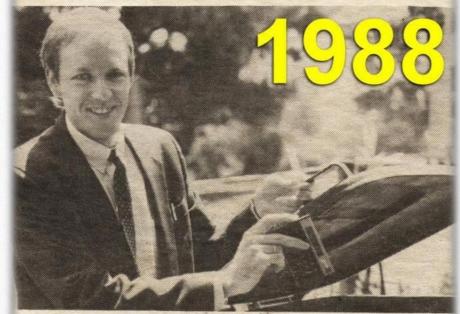
positive plus zero is positive

**AS5** negative plus zero is negative zero plus zero is zero

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## Maths? It's all in the mind, says Jonathan



JONATHAN throws away his calculator and uses brain powers to solve even the hardest of equations.

F you were asked what day it was n July 24, 1706, what would you ay?

It's all in the mind, he says.

After a four second calculation he ame up with the correct day.

"I hope to change the way the West ern world teaches maths," Jonatho said.

at the Park Orchards Community Centre.

"I hope to change the way the Western world teaches maths," Jonathon









### 2011



### Mastering maths

An Aussie maths teacher has developed a fun new way to tackle age-old numerical concepts



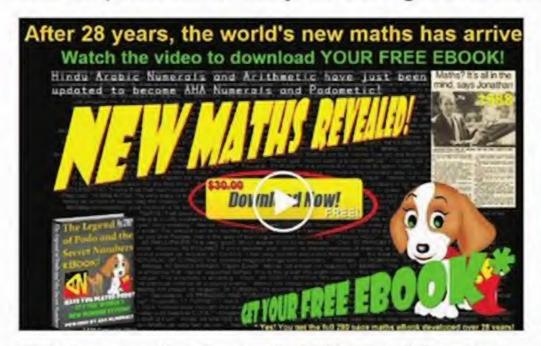
The terms "Podametii" and "Australian Hindu Anabic" (AHA) numeral system may sound blasphemous to purists, but these could well be the hottest additions to the maths lexicon, when Geelong-based Jonathan Crabtree unveils his dream project - The legand of Podo and the Secret Numbers.

#### Maths made easy

Three decades in the making, the picture web book Legend of Pado is a novel concept in maths teaching. Aimed at young children and their parents, particularly those with learning difficulties, Crabtree believes it will demystify the subject and make learning "fun, fast and easy".

"AHA not just a new number system, it's a new visual way of learning numbers that matches the way children's brains function through geometric concepts," he claims.

According to Crabtree, because of the



and in due course, masters them to become Super Puppy. Podo eventually replaces his mentor Arith, as the ruler of Metic Land.

Using creative visual aids like Bumps, Holes, Power Ups, Circle, Lettumbers, Dig Its, Pig Its, he comes up with the hot-wired for geometry before we learn to speak. The use of this type of instruction taught at the same time we learn digits, he adds is, however, the wrong way to teach mathematics. According to Crabtree, the written words and symbols should be

make after the street made among the last



Arithmophobia or fear of numerical concepts is a common phenomenon among

excedente cechiah 16





### Crabtree's counting on a new number system



JONATHAN Crabtree would like to see the way children learn maths

simple improvement in a product overdue by over a thousand years."

"What I am doing is summarising all the maths number theory up until a vertical axis because it reflects the world in which children live.

changed. long man the whole changed.

"We me Roman nu Hindu-Ara and now new systen said. "The reason is been hated

"My new

NEWS

### Seaholme man's dogged determination

Printer Friendly A- A+ Text size

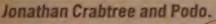
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# E 8

29 MAY 12 @ 01:19PM | BY FIONA O'DOHERTY









LYING on his back in hospital with a smashed spine and facing the prospect of never walking again, Jonathan Crabtree made an unusual promise to a God he didn't believe in at the time.

"Let me walk and have children, and I will change the way the world does maths," Mr Crabtree said.

Twenty-five years later the Seaholme resident is walking, has children and is on his way to keeping his promise with the help of Podo the Super Puppy.

Mr Crabtree was badly hurt in a motorcycle accident at 21 and spent months in hospital, which gave him time



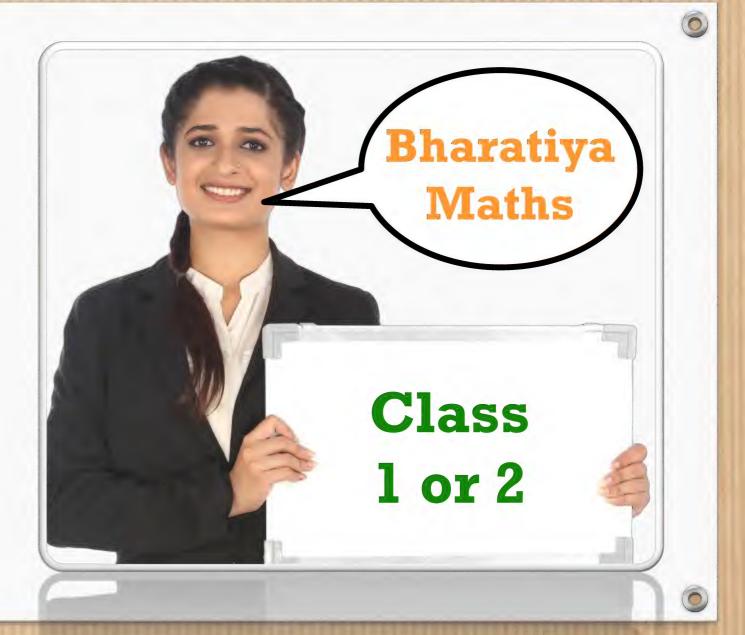
www.podometic.in/vhs-talk





# Class 7 Neg. + Pos.

$$-3 + +7$$





## Class 1 and 2 Children Play the Happy Harappan Positive + Brick and Negative – Hole Game!









Podo the Puppy by AFX Animation Kolkata, India.

3 Holes

<sup>-3</sup> + <sup>+7</sup> = ?

7 Positives



3 Negatives

<sup>-3</sup> + <sup>+7</sup> = ?

7 Positives



3 Negatives

### 3 Holes <sup>-3</sup> and 7 Bricks <sup>+7</sup> = 4 Bricks <sup>+4</sup>



$$^{-3} + ^{+7} = ^{+4}$$

Brahmagupta's

**Addition Sutra #3** 

### Brahmagupta's 5 Addition Sutras

धनयोर्धनम्ऋणमृणयोः धनर्णयोरन्तरं समैक्यं खम् ऋणमैक्यं च धनमृणधनशून्ययोः शून्ययोः शून्यम्

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**AS1** positive plus positive is positive

0

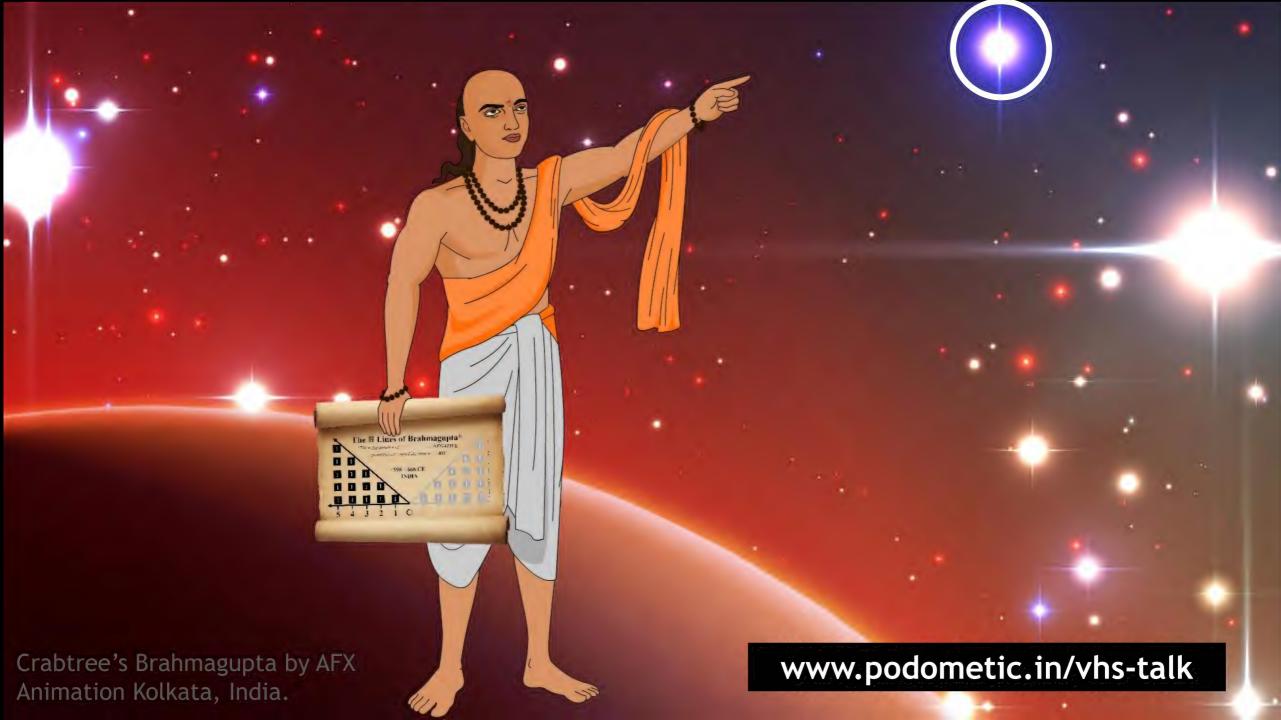
0

- **AS2** negative plus negative is negative
- positive plus negative is the difference between the positive and negative
- AS4 when positive and negative are equal the sum is zero

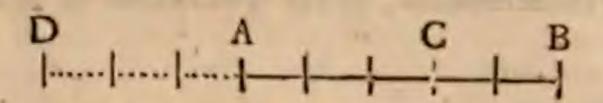
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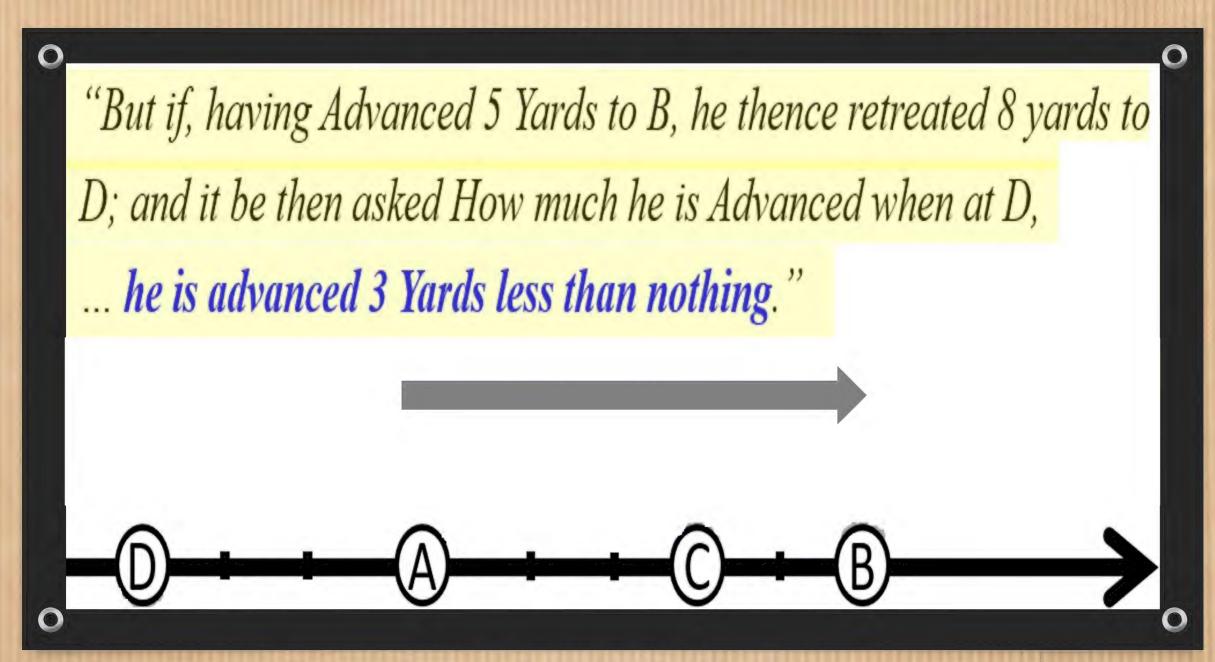


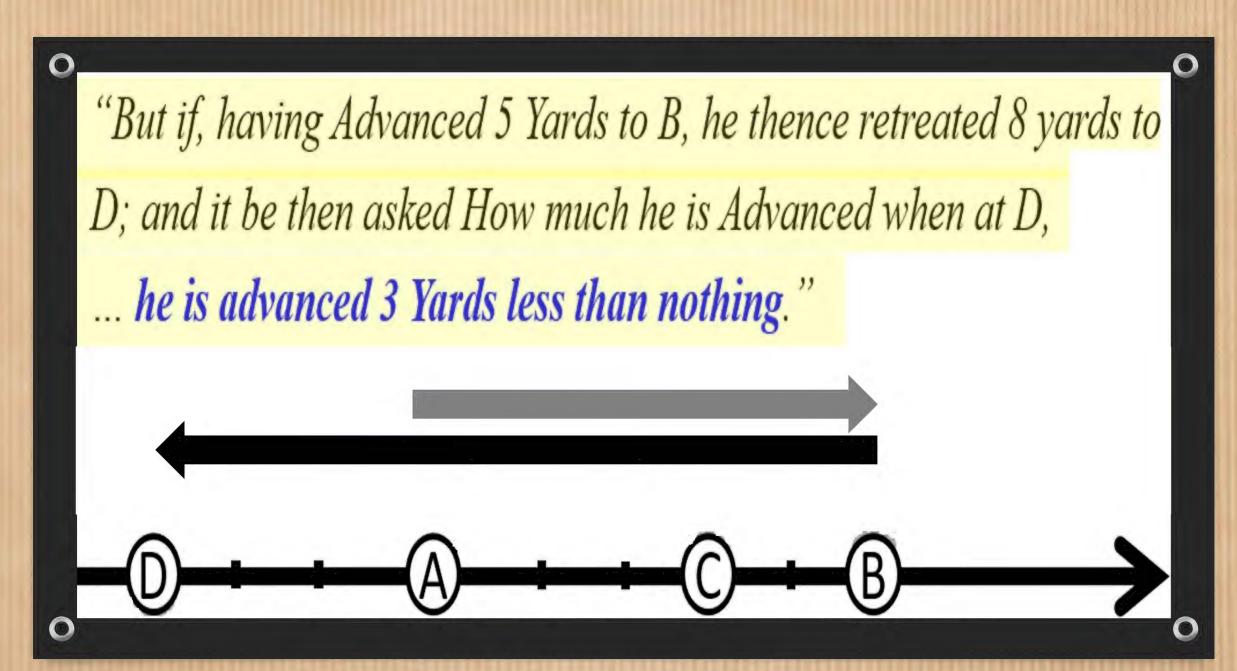
As for instance: Supposing a man to have advanced or moved forward, (from A to B<sub>5</sub>) 5 Yards; and then to retreat (from B to C) 2 Yards: If it be asked, how much he had Advanced (upon the whole march) when at C? or how many Yards he is now Forwarder than when he was at A? I find (by Subducting 2 from 5,) that he is Advanced 3 Yards. (Because - 5 - 2 = -1 3.)

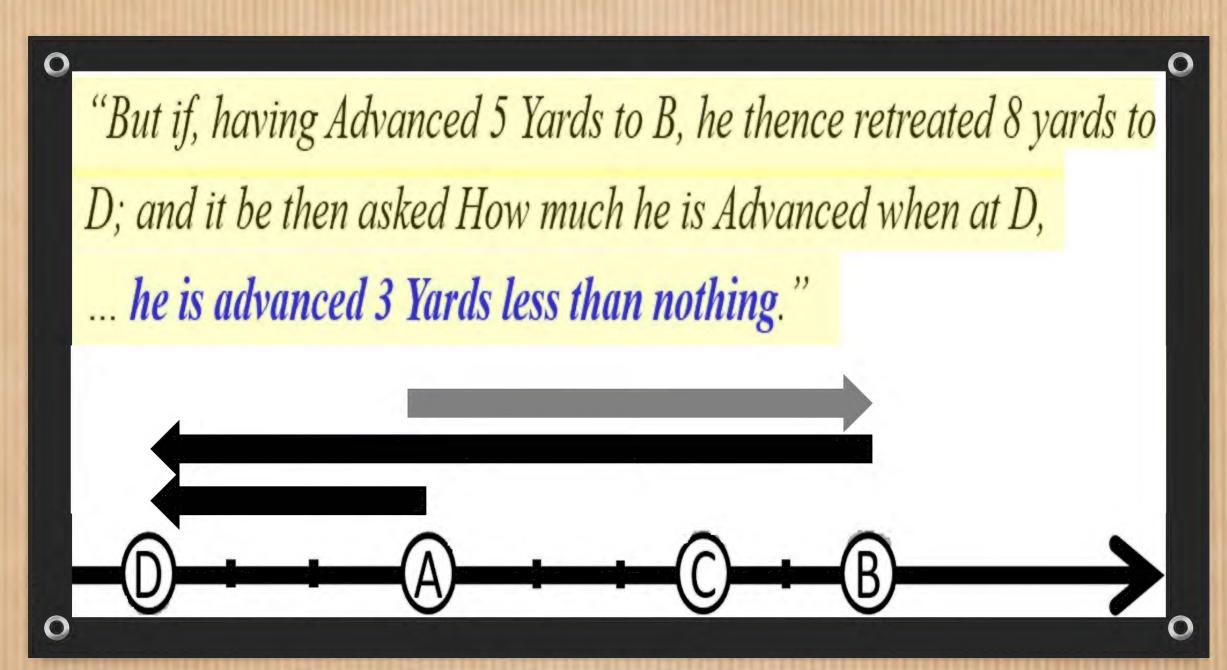


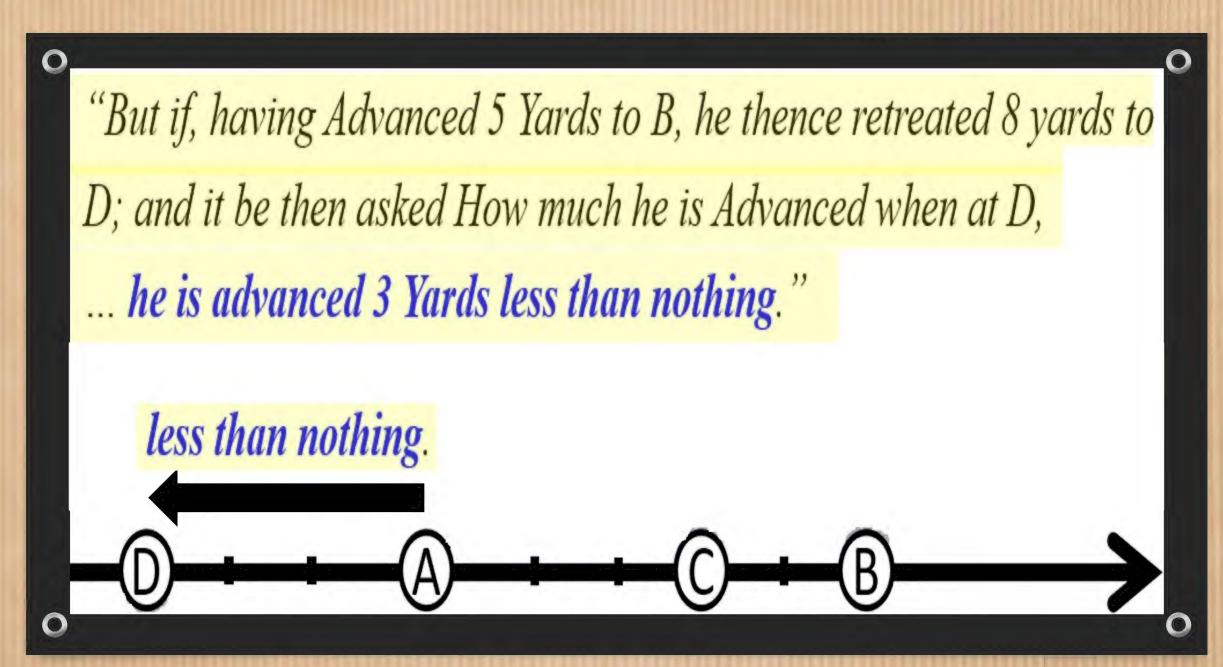
But if, having Advanced 5 Yards to B, he thence Retreat 8 Yards to D; and it be then asked, How much he is Advanced when at D, or how much Forwarder than when he was at A: I fay -3 Yards. (Because +5-8=-3.) That is to fay, he is advanced 3 Yards less than nothing.

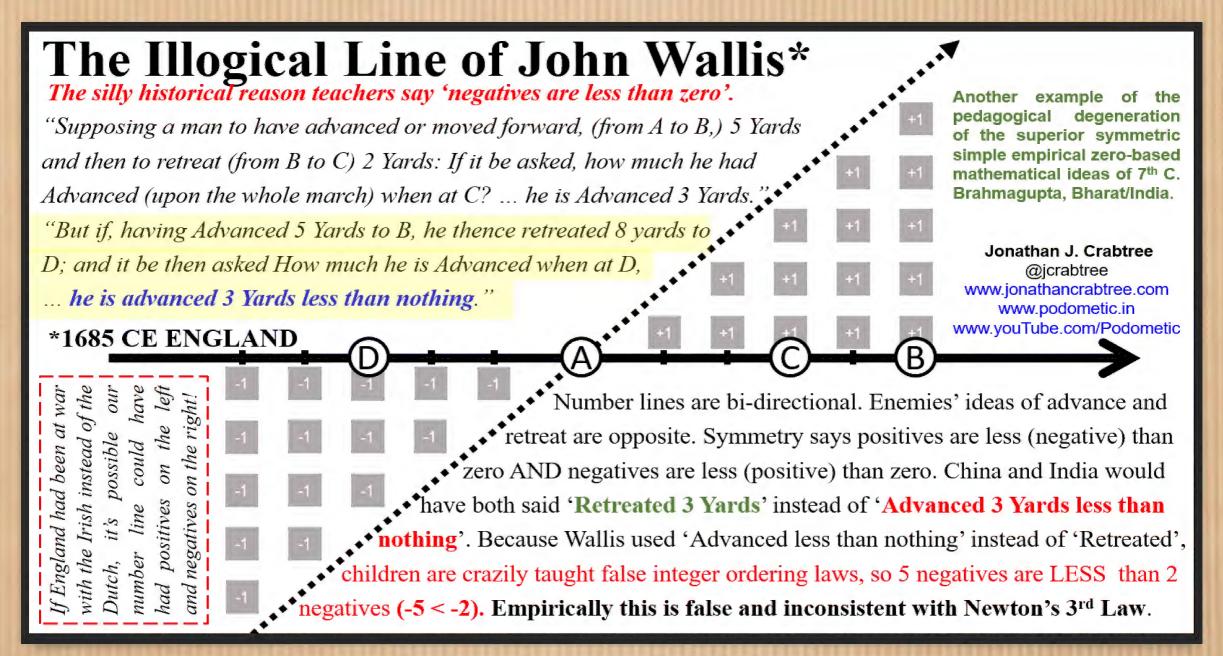
### John Wallis, p.265, A Treatise of Algebra 1685.

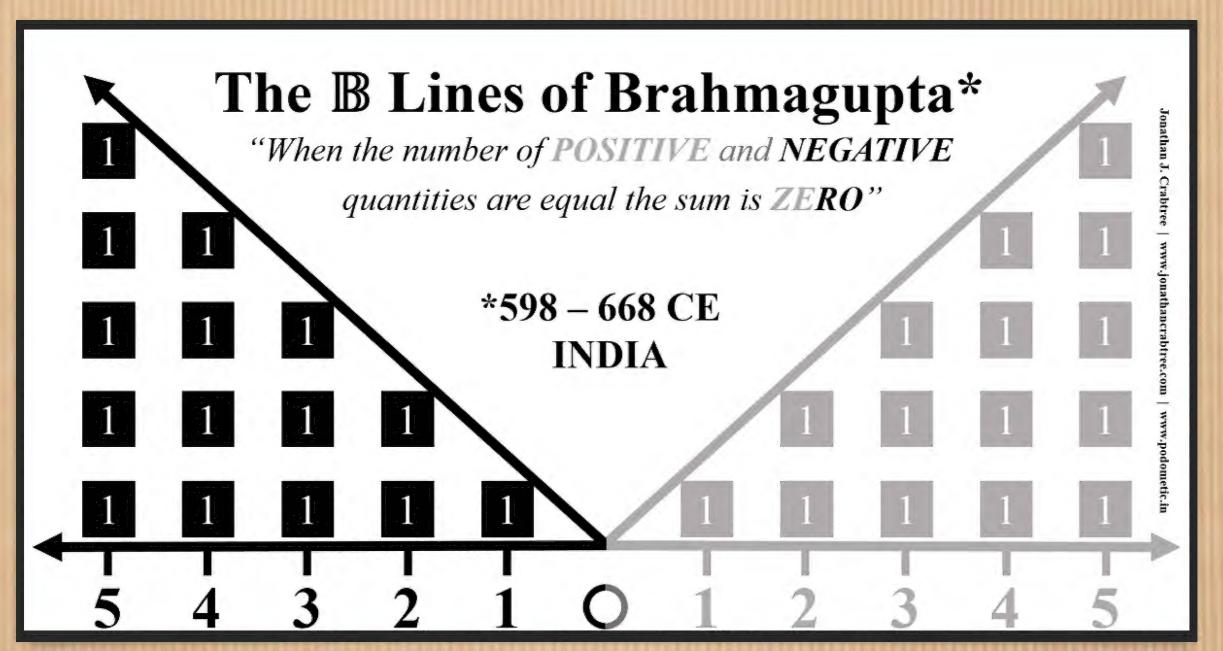












- A smaller positive subtracted from a larger positive is positive.
- A smaller negative subtracted from a larger negative is negative.
- If a larger negative or positive is to be subtracted from a smaller negative or positive, the sign of their difference is reversed negative becomes positive and positive negative.
- A negative minus zero is negative, a positive minus zero is positive, minus zero is zero.

When a **positive** is to be subtracted from a **negative** or a **negative** from a **positive**, then it is to be added.

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What does negative seven minus negative four equal?





Noun(s) Adjective Noun(s) Verb Adjective Noun(s) Adjective  $\odot$ Augend Add Addend Units Units Units Sum The Grammar of Podometic Aligns with Logic Adjective Noun(s) Verb Adverb Adjective Noun(s)  $\odot$ 6 Multiplicand Units Multiplier **Product** Units Multiply



What does seven negatives minus four negatives equal?

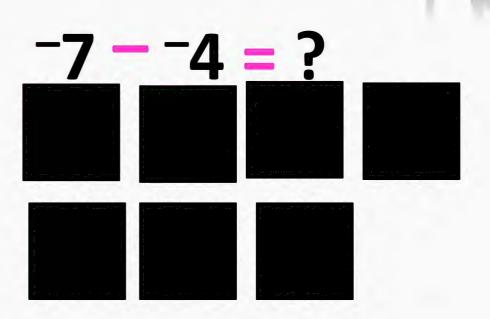








What does seven negatives minus four negatives equal?











What does seven negatives minus four negatives equal?











So, what is -7 - +4?







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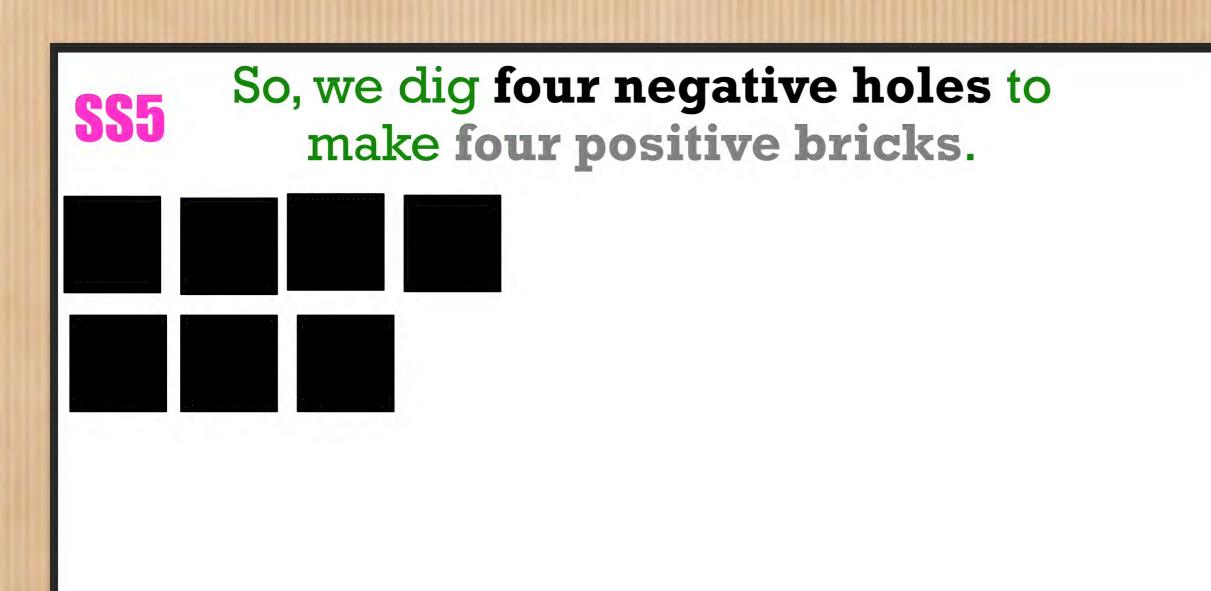
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# What does seven negatives (holes) minus four positives (bricks) equal?





Wait! We can't take away four positives (bricks) because we don't have any!



#### Brahmagupta's 5 Addition Sutras

धनयोर्धनम्ऋणमृणयोः धनर्णयोरन्तरं समैक्यं खम् ऋणमैक्यं च धनमृणधनशून्ययोः शून्ययोः शून्यम्

**AS1** positive plus positive is positive

0

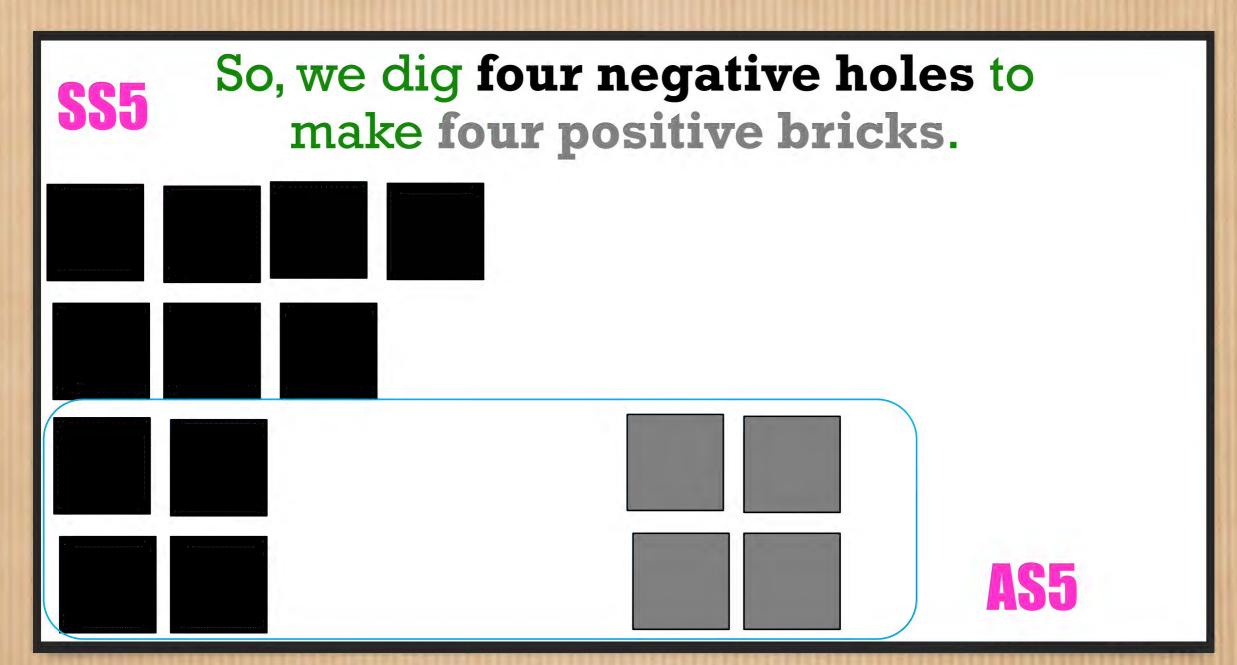
0

- **AS2** negative plus negative is negative
- positive plus negative is the difference between the positive and negative
- AS4 when positive and negative are equal the sum is zero

positive plus zero is positive

**AS5** negative plus zero is negative zero plus zero is zero

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#### Brahmagupta's 5 Addition Sutras

धनयोर्धनम्ऋणमृणयोः धनर्णयोरन्तरं समैक्यं खम् ऋणमैक्यं च धनमृणधनशून्ययोः शून्ययोः शून्यम्

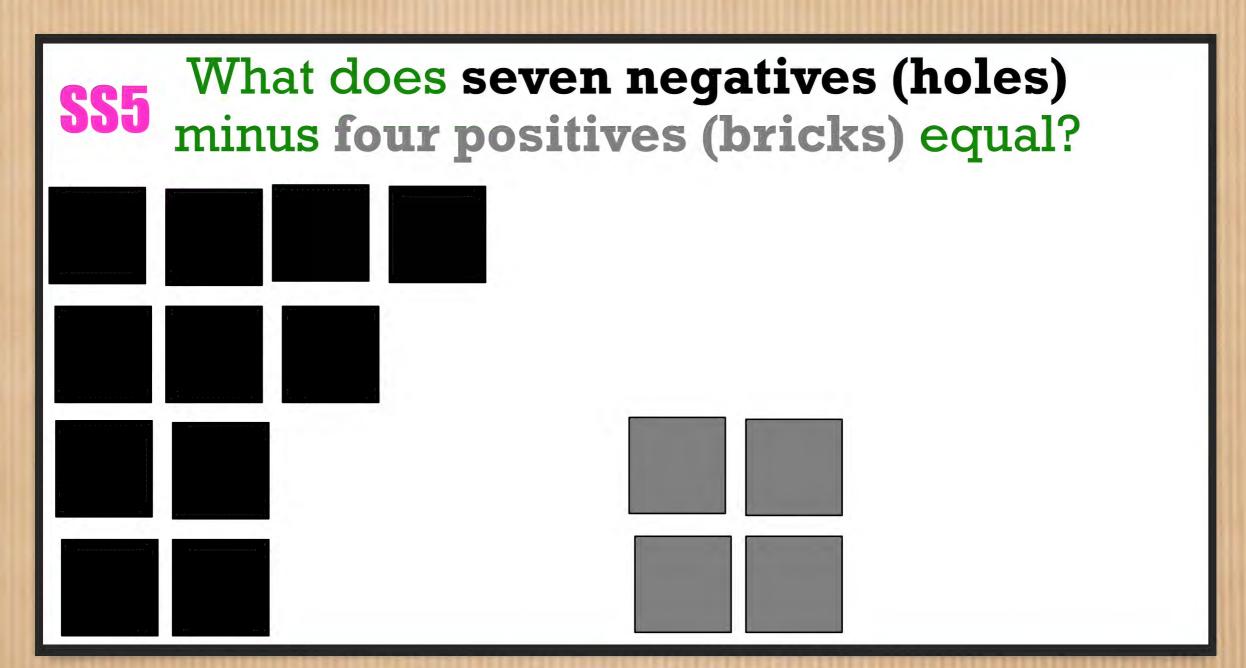
positive plus positive is positive

0

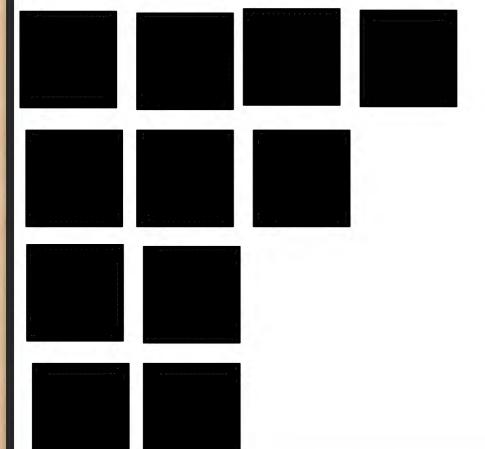
0

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- **AS5** negative plus zero is negative
  - zero plus zero is zero

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#### Brahmagupta's 4 Multiplication Sutras

ऋणमृणधनयोधीतो धनमृणयोः धनवधो धनं भवति शून्यर्णयोः खधनयोः खशून्ययोवी वधः शून्यम्

The product of a negative and a positive is negative.

The product of two negatives is positive.

The product of two positives is positive.

The product of zero and a negative,

zero and a positive, or

two zeros is zero.

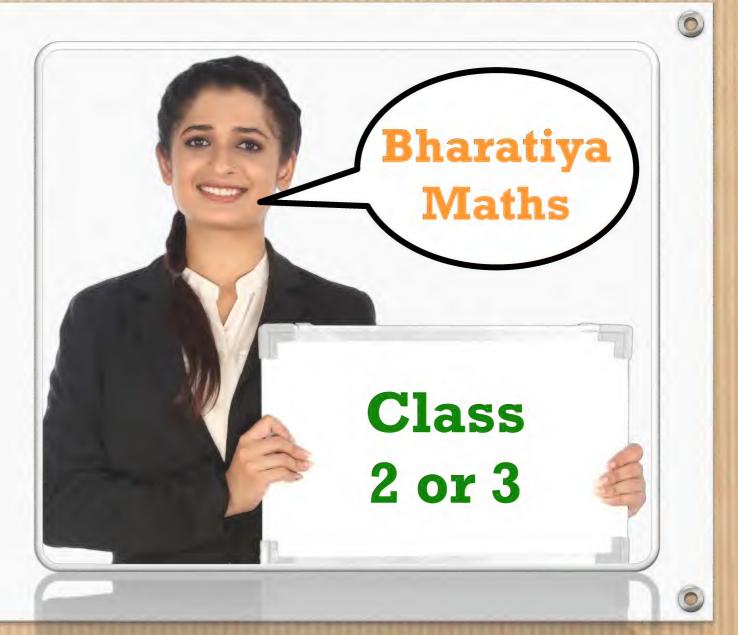
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#### Class 8 Neg. × Neg..

PROVE WHY  $-1 \times -1 = +1$ 







$$-1 \times -1 = +1$$

$$1 + (-1) = 0$$
 Definition of -1.



$$-1 \times -1 = +1$$

1 + (-1) = 0	Definition of -1.
$-1 \times [1 + (-1)] = -1 \times 0$	Both sides multiplied by -1.



$$-1 \times -1 = +1$$

1 + (-1) = 0	Definition of -1.
$-1 \times [1 + (-1)] = -1 \times 0$	Both sides multiplied by -1.
$(-1) \times 1 + (-1) \times (-1) = 0$	Distributive law



## negatives is positive

The product of two 
$$-1 \times -1 = +1$$

1 + (-1) = 0	Definition of -1.	
$-1 \times [1 + (-1)] = -1 \times 0$	Both sides multiplied by -1.	
$(-1) \times 1 + (-1) \times (-1) = 0$	Distributive law	
$(-1) + (-1) \times (-1) = 0$	Multiplicative identity	



$$-1 \times -1 = +1$$

1 + (-1) = 0	Definition of -1.	
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$(-1) \times 1 + (-1) \times (-1) = 0$	Distributive law	
$(-1) + (-1) \times (-1) = 0$	Multiplicative identity	
$1 + [(-1) + (-1) \times (-1)] = 1 + 0$	Add 1 to both sides	



$$-1 \times -1 = +1$$

1 + (-1) = 0	Definition of −1.	
$-1 \times [1 + (-1)] = -1 \times 0$	Both sides multiplied by -1.	
$(-1) \times 1 + (-1) \times (-1) = 0$	Distributive law	
$(-1) + (-1) \times (-1) = 0$	Multiplicative identity	
$1 + [(-1) + (-1) \times (-1)] = 1 + 0$	Add 1 to both sides	
$[1 + (-1)] + (-1) \times (-1) = 1 + 0$	Associative law	



## negatives is positive

The product of two 
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1 + (-1) = 0	Definition of -1.	
$-1 \times [1 + (-1)] = -1 \times 0$	Both sides multiplied by -1.	
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$(-1) + (-1) \times (-1) = 0$	Multiplicative identity	
$1 + [(-1) + (-1) \times (-1)] = 1 + 0$	Add 1 to both sides	
$[1 + (-1)] + (-1) \times (-1) = 1 + 0$	Associative law	
$0 + (-1) \times (-1) = 1 + 0$	Additive identity	



1 + (-1) = 0	Definition of -1.	
$-1 \times [1 + (-1)] = -1 \times 0$	Both sides multiplied by -1.	
$(-1) \times 1 + (-1) \times (-1) = 0$	Distributive law	
$(-1) + (-1) \times (-1) = 0$	Multiplicative identity	
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$0 + (-1) \times (-1) = 1 + 0$	Additive identity	
$(-1)\times(-1)=1$	Desired Outcome	



$$-1 \times -1 = +1$$

A demonstration goes like this...

1 + (-1) = 0	Definition of −1.	
$-1 \times [1 + (-1)] = -1 \times 0$	Both sides multiplied by -1.	
$(-1) \times 1 + (-1) \times (-1) = 0$	Distributive law	
$(-1) + (-1) \times (-1) = 0$	Multiplicative identity	
$1 + [(-1) + (-1) \times (-1)] = 1 + 0$	Add 1 to both sides	
$[1 + (-1)] + (-1) \times (-1) = 1 + 0$	Associative law	
$0 + (-1) \times (-1) = 1 + 0$	Additive identity	
$(-1)\times(-1)=1$	Desired Outcome	

Crabtree, Jonathan J. A new reason negative multiplied by negative is positive Vinculum, Vol. 52, No. 3, Jul 2015

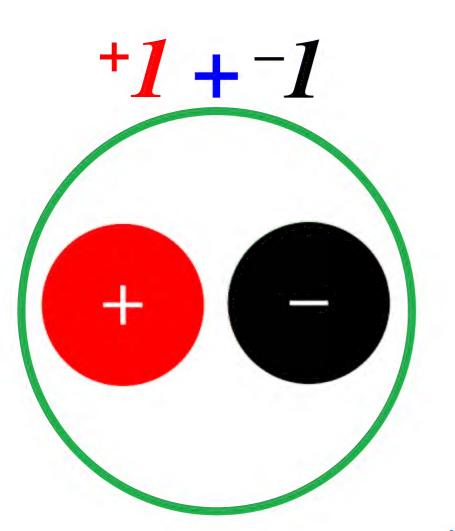


## Negative Multiplicand Multiplied by Negative Multiplier

-1 subtracted from zero 1 times

#### **Brahmagupta Defined ZERO in Law AS4**

when positive and negative are equal the sum is ZERO



-1 × -1

-1 subtracted
from zero 1 times

#### Class 8

1 + (-1) = 0	Definition of −1.	
$-1 \times [1 + (-1)] = -1 \times 0$	Both sides multiplied by -1.	
$(-1) \times 1 + (-1) \times (-1) = 0$	Distributive law	
$(-1) + (-1) \times (-1) = 0$	Multiplicative identity	
$1 + [(-1) + (-1) \times (-1)] = 1 + 0$	Add both sides to 1.	
$[1 + (-1)] + (-1) \times (-1) = 1 + 0$	Associative law	
$0 + (-1) \times (-1) = 1 + 0$	Definition of -1	
$(-1)\times(-1)=1$	Additive identity	

$$-1 \times -1$$

-1 subtracted from zero 1 times

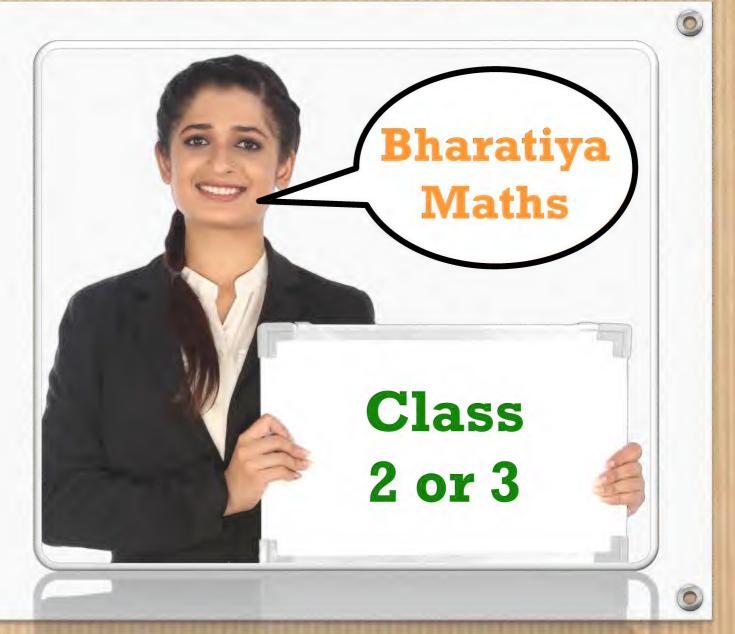
$$-1 \times -1 = +1$$



#### Class 8 Neg. × Neg..

PROVE WHY  $-1 \times -1 = +1$ 







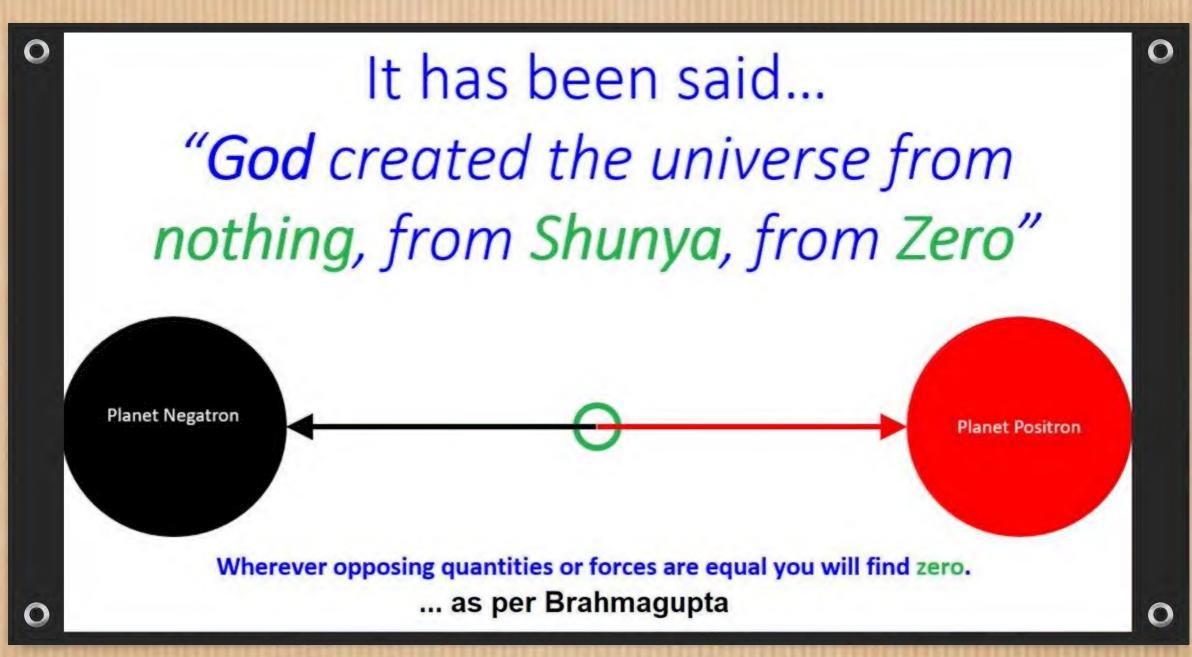


# 'Void White' by Irma den Hertog

#### A Bonus BIG Idea? Rebuild Maths from Physics







## BIG BANG!

It's as if SUNYA was decompressed, creating infinite magnitudes and multitudes from ZERO

Zero Sum Universe Conservation Of Matter And Energy Newton's Third Law Brahmagupta Bhāskara Symmetry Podometic







## The Second BIG Idea? Teach Better Bharartiya Maths! DID YOU KNOW?

Arithmetic 300 BCE (British Maths)
Updated wrongly since the Renaissance
Podometic 700 CE (Bharatiya Maths)
Updated correctly since 18<sup>th</sup> March 1983



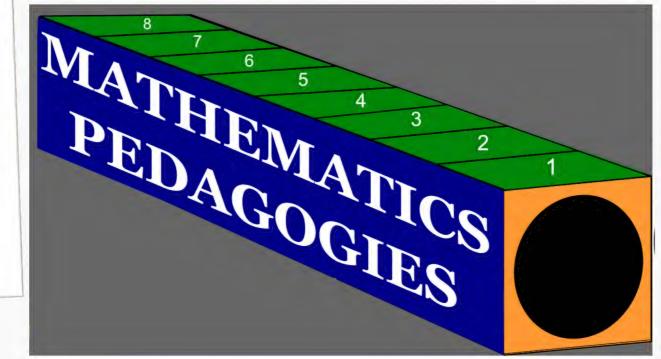






## The Second BIG Idea? Teach Better Bharartiya Maths!







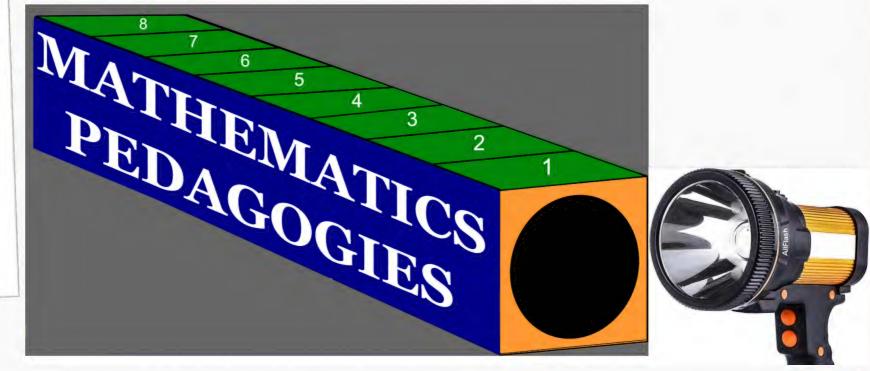






## The Second BIG Idea? Teach Better Bharartiya Maths!



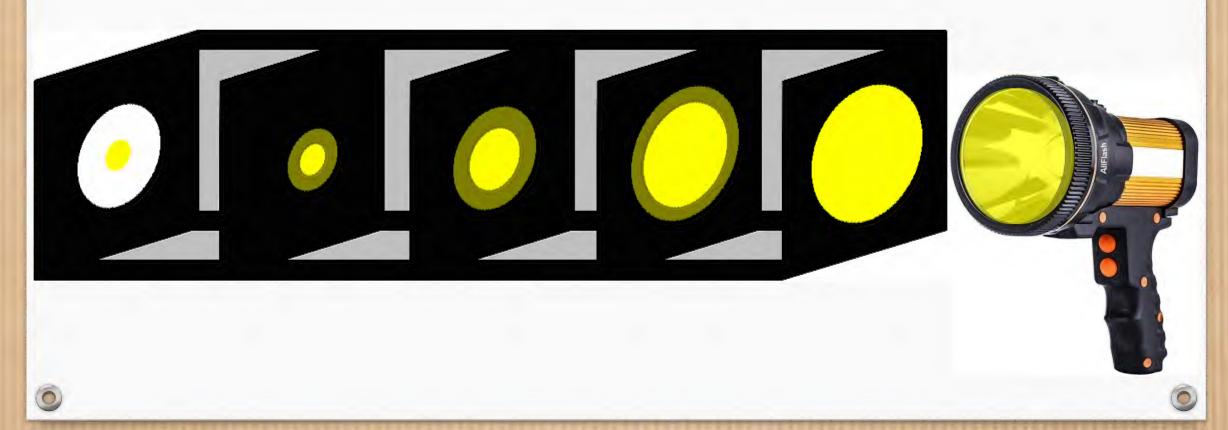


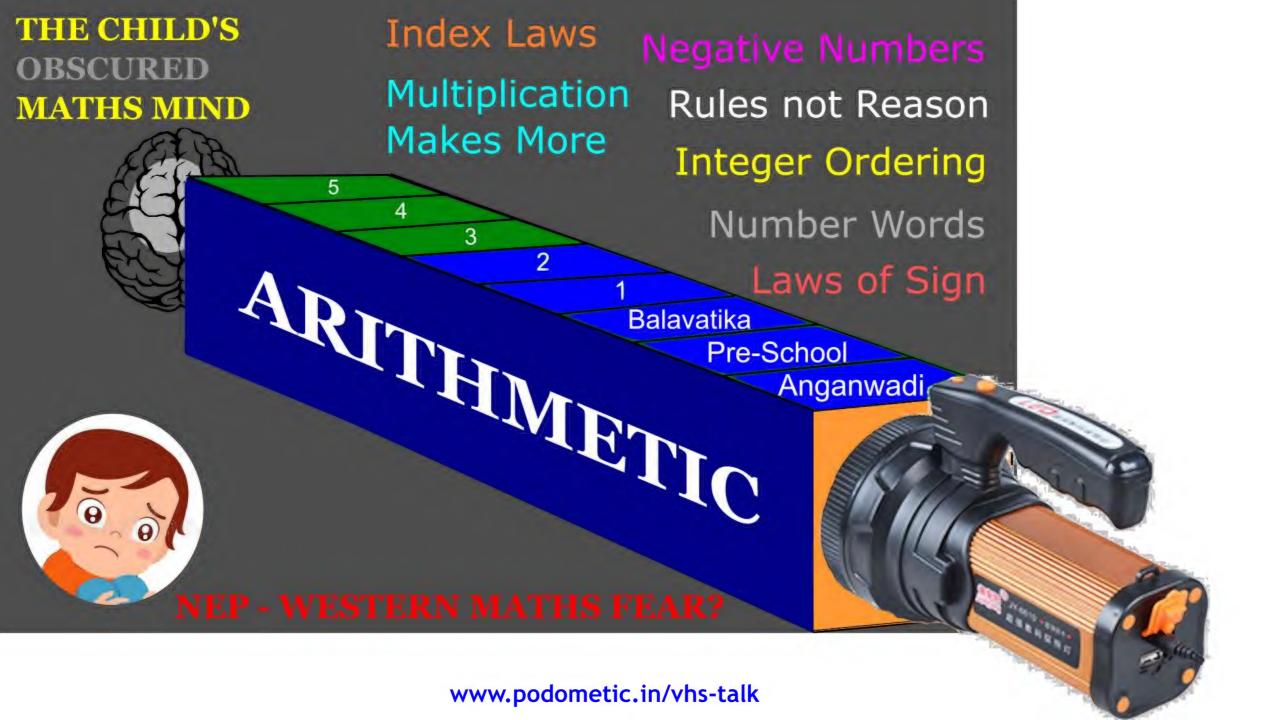












### ARITHMETIC (BRITISH MATHS)

Testing the teaching of  $+ - \times \div$  with  $\pm 12$  and  $\pm 4$ 

Do British origin school maths lessons pass the common-sense test? NO	<sup>+</sup> 12 & <sup>+</sup> 4 pos & pos	<sup>+</sup> 12 & <sup>-</sup> 4 pos & neg	<sup>-</sup> 12 & <sup>+</sup> 4 neg & pos	-12 & -4 neg & neg
Addition +	+12 + +4	+12 + -4	$^{-}12 + ^{+}4$	<sup>-</sup> 12 + <sup>-</sup> 4
Subtraction –	<sup>+</sup> 12 - <sup>+</sup> 4	+12 - 4	$^{-}12 - ^{+}4$	<sup>-</sup> 12 - <sup>-</sup> 4
Multiplication ×	+12 × +4	+12 × -4	$^{-}12 \times {}^{+}4$	<sup>-</sup> 12 × <sup>-</sup> 4
Division ÷	+12 ÷ +4	+12 ÷ -4	<sup>-</sup> 12 ÷ <sup>+</sup> 4	-12 ÷ -4
Arithmetic fails as it wasn't b	uilt from zero	PASS	FAIL	Absent

#### PISA 2018 worldwide ranking The Program for International Student Assessment (PISA) is a worldwide study by OECD in 78 nations of 15-year-old students' scholastic performance on mathematics, science and reading. average score of math, science and reading 🍘 facts<mark>maps</mark>.com🗘🗘 💿 Source: OECD, 2018-2019 above 500 450-500 below 450 Inaccurate Map RUSSIA Below 450 Serbia 442.3 438.0 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. Cyprus 437.7 **Un. Arab Emirates** 433.7 UNITED STATES 431.0 428.0 Romania 426.7 424.3 423.7 423.0 422.0 Uruguay Brunei Above 500 Montenegro | China (B-S-J-Z)\* 578.7 | Singapore 556.3 | Macao 542.3 | Hong Kong 530.7 | Estonia 525.3 | Japan 520.0 | South Korea 519.7 | Canada 516.7 | Taiwan 516.7 | Finland 516.3 | Poland 513.0 | 419.7 416.0 416.0 414.7 Jordan Mexico 58. 59. 60. 61. Costa Rica 413.3 412.7 405.3 Thailand Colombia AUSTRALIA 402.3 402.3 402.3 401.7 Kazakhstan Azerbaijan Bosnia and Herz. Between 450-500 Peru 513.0 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 33. 34. 35. 36. 37. 38. 39. 40. Brazil 400.3 Ireland North Macedonia 400.0 503.7 503.7 502.7 502.3 Slovenia 68. 395.0 Argentina United Kingdom 387.0 386.0 382.0 376.7 69. 70. 71. 72. 73. 74. 75. New Zealand **United States** Netherlands Saudi Arabia Indonesia 501.0 Sweden 500.3 Denmark 368.0 500.3 365.0 20. Belgium 500.0 361.3 350.0 334.3 \* Beijing, Shanghai, Jiangsu, Zhejiang Tamil Nadu Himachal Pradesh 327 **2009 PISA RESULT** www.podometic.in/vhs-talk





#### Indian Maths Education?

www.bit.ly/mathsdata

#### Indian students rank 2nd last in global test

Hemail Chhapia | TNN | Jan 15, 2012, 02 24 IST











global survey has found that the average 15-yea... Read More

MUMBAI: Across the world, India is seen as an education powerhouse based largely on the reputation of a few islands of academic excellence such as the IITs. But scratch the glossy surface of our education system and the picture turns seriously bleak.

Fifteen-year-old Indians who were put, for the first time, on a global stage stood second to last, only beating Kyrgyzstan when tested on their reading,



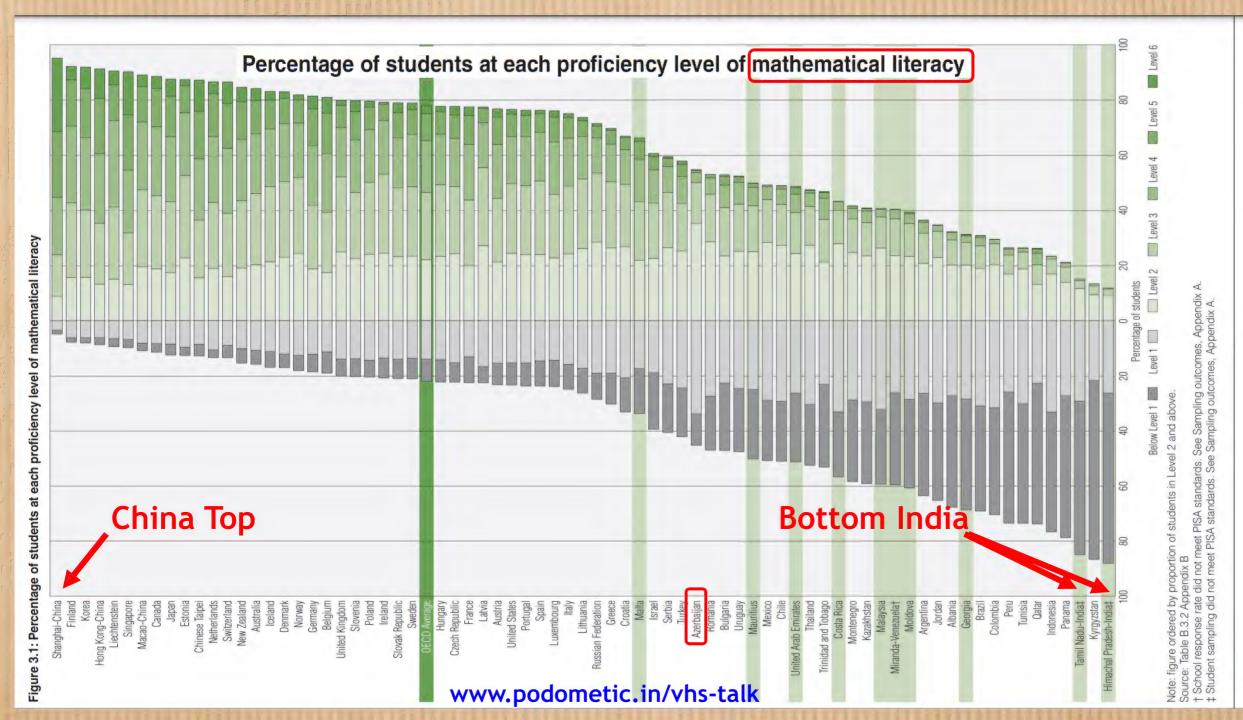


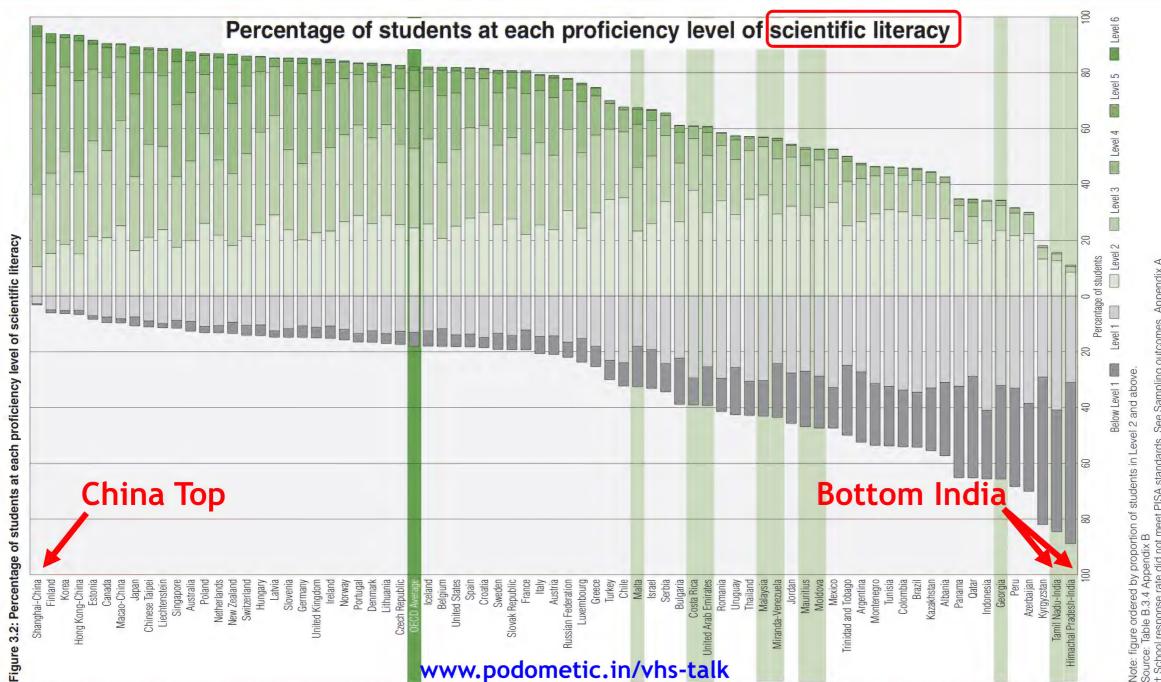
#### **PISA Mathematics Survey?**

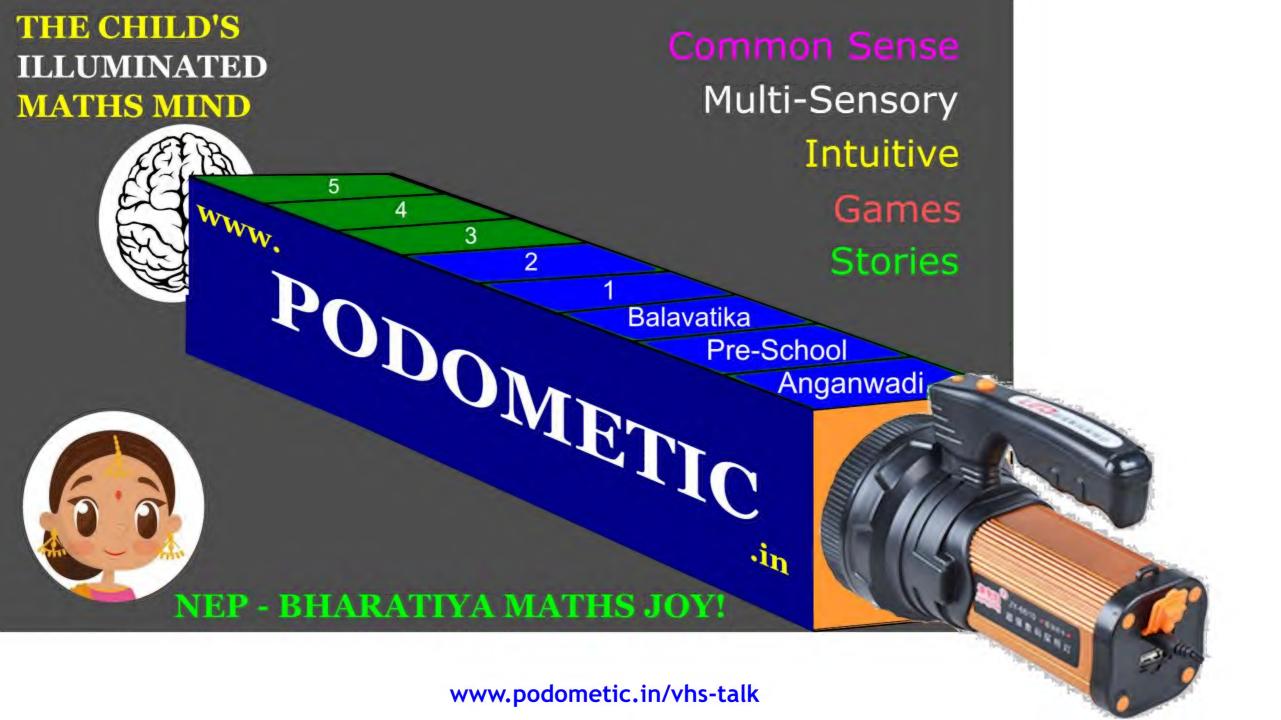
(Programme for International Student Assessment)

In Tamil Nadu and Himachal Pradesh 15% and 12% of students are ready to use mathematics in ways that are considered fundamental for their future development.

The OECD average is 75%, www.bit.ly/mathsdata







## PODOMETIC™ (BHARATIYA MATHS)

Testing the teaching of  $+ - \times \div$  with  $\pm 12$  and  $\pm 4$ 

Do Indian origin school maths lessons pass the common-sense test? <b>YES</b>	<sup>+</sup> 12 & <sup>+</sup> 4 pos & pos	<sup>+</sup> 12 & <sup>-</sup> 4 pos & neg	-12 & +4 neg & pos	-12 & -4 neg & neg
Addition +	+12 + +4	+12 + -4	<sup>-</sup> 12 + <sup>+</sup> 4	<sup>-</sup> 12 + <sup>-</sup> 4
Subtraction -	<sup>+</sup> 12 - <sup>+</sup> 4	<sup>+</sup> 12 - <sup>-</sup> 4	<sup>-</sup> 12 - <sup>+</sup> 4	<sup>-</sup> 12 - <sup>-</sup> 4
Multiplication ×	+12 × +4	<sup>+</sup> 12 × <sup>-</sup> 4	$^{-}12 \times {}^{+}4$	<sup>-</sup> 12 × <sup>-</sup> 4
Division ÷	+12 ÷ +4	+12 ÷ -4	-12 ÷ +4	-12 ÷ -4
Podometic™ passes as was built from zero		PASS	FAIL	Absent



# Explanations of Zero Positive and Negative?



# TRUE





## Save Your S chools T ime E ffort & Money!



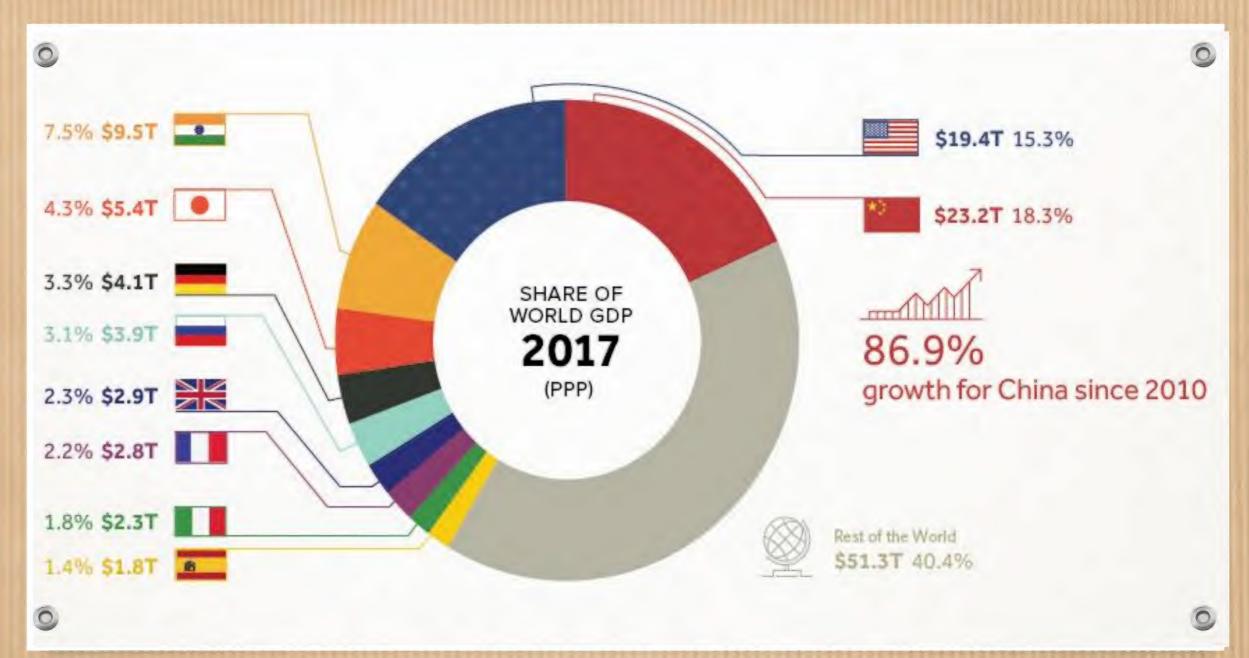


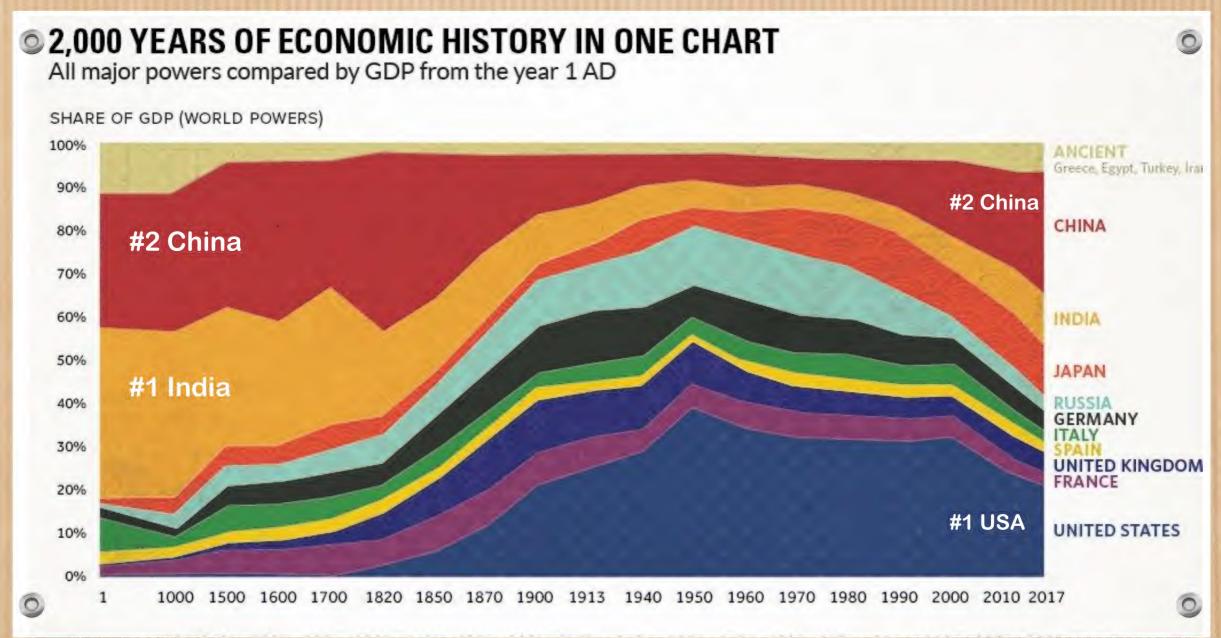
## The Third BIG Idea?

Become an Economic Superpower









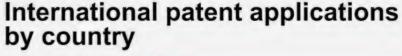


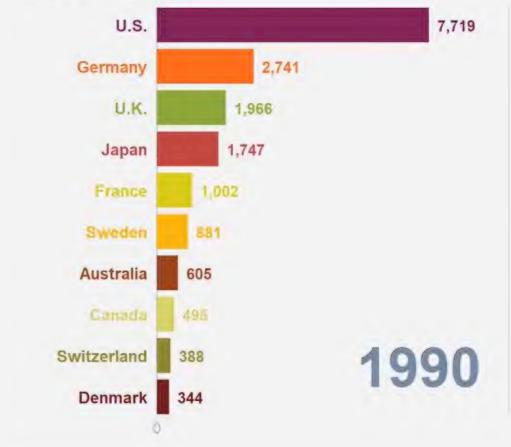


# The Patent Power Race

1990 to 2019

U.S. vs.
China vs.
India









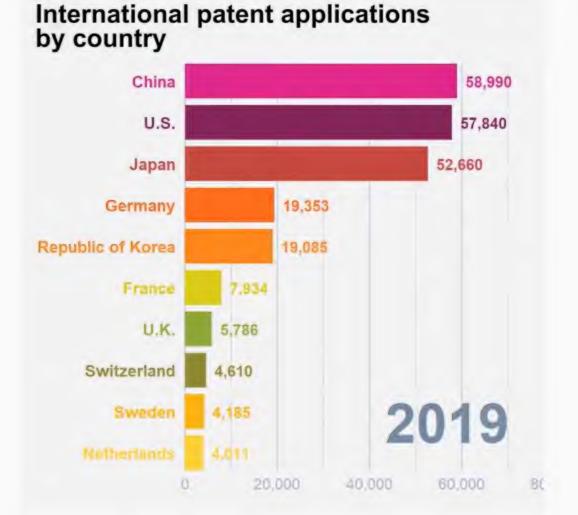




# The Patent Power Race

1990 to 2019

U.S. vs. China vs. India







There is a positive correlation between academic performance in STEM subjects (in particular math) and economic strength\*

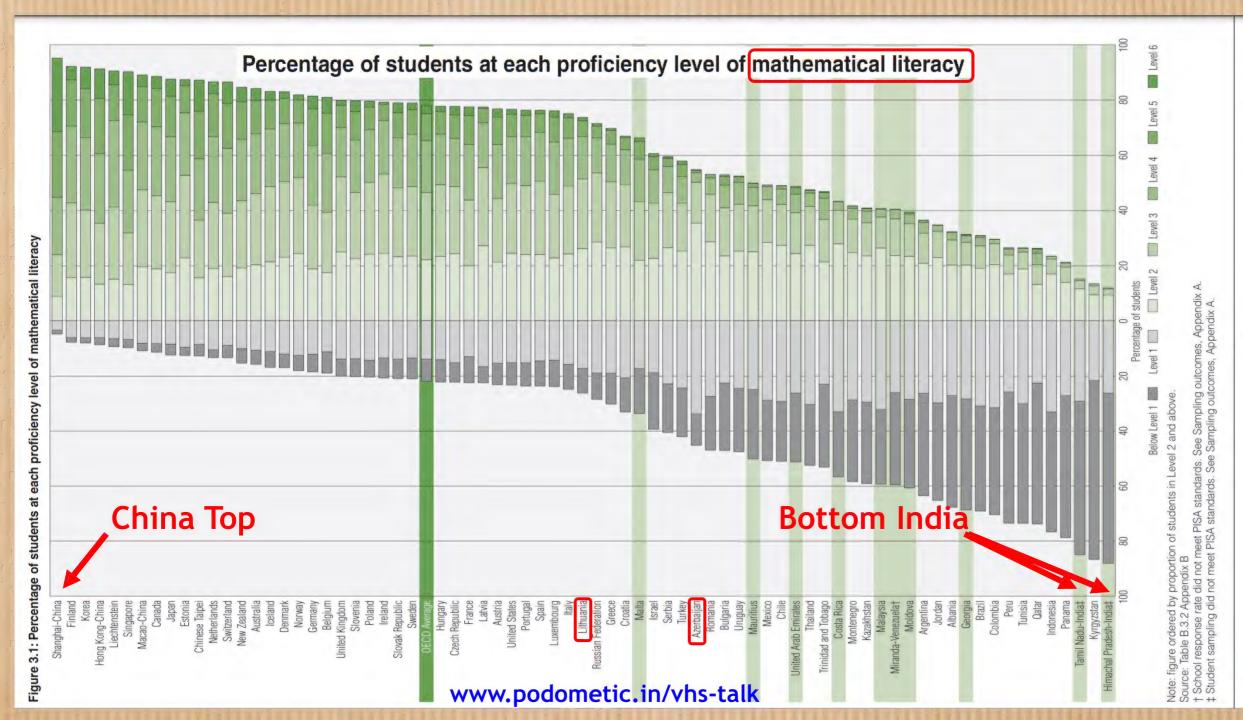
Small improvements in the skills of a nation's labour force can have very large impacts on future well-being\*\*

Moreover, the gains, put in terms of current GDP, far outstrip today's value of the short-run business-cycle management\*\*

1% increase in PISA scores is estimated to lead to an increase in GDP growth of around 0.3% Maths scores were found to have the largest impact on economic growth... \*\*\*

#### SOURCES

\* DiCorrado, Eric et al. "The Relationship Between Mathematical Performance and GDP per Capita." (2015) \*\* OECD, The high Cost of Low Educational performance. \*\*\* The Economic Impact of Improving Schooling Quality, Deloitte Access Economics for the Australian Government Department of Education 2016.



PISA Plus 2009

"My goal is for India to become #1 in the world for mathematics education results. However, if by teaching Podometic™ instead of Arithmetic over the next decade it only catches up to Azerbaijan, India's GDP may have grown by an EXTRA 7.5 PERCENT.

0

By gifting Podometic™ Bharatiya Maths to Prime Minister Narendra Modi, Jonathan J. Crabtree may have gifted the government of India a US\$250 Billion increase in GDP.

If by teaching Podometic<sup>™</sup> instead of Arithmetic over the next decade it only catches up to Lithuania, **India's GDP** may have grown by an <u>EXTRA</u> 11 PERCENT." Jonathan J. Crabtree | Founder Podometic<sup>™</sup> Bharatiya Maths



## The L.A.S.T.

'Missing' Big Idea...







## The LAST BIG Idea?

Survival Beyond 2300 India's

L.A.S.T.

Chance







## **CAN INDIA SURVIVE THE NEXT 500 YEARS?**



"Beyond potential wars over diminishing resources, India may be on the cusp of mass starvation and natural disasters unless it can find scientific solutions to major threats to Mother Earth." JJC







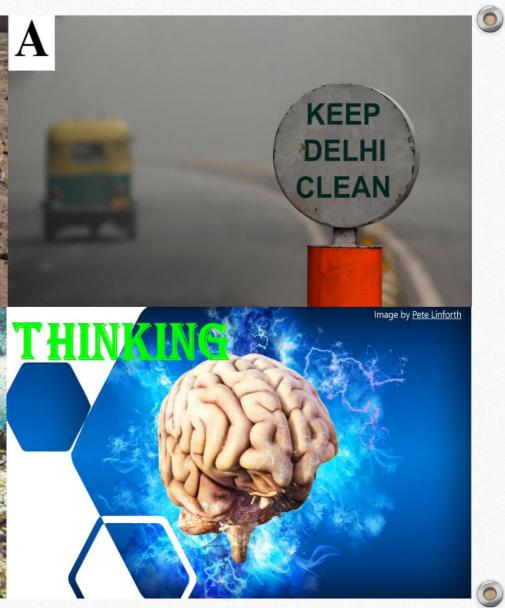
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**AIR** 

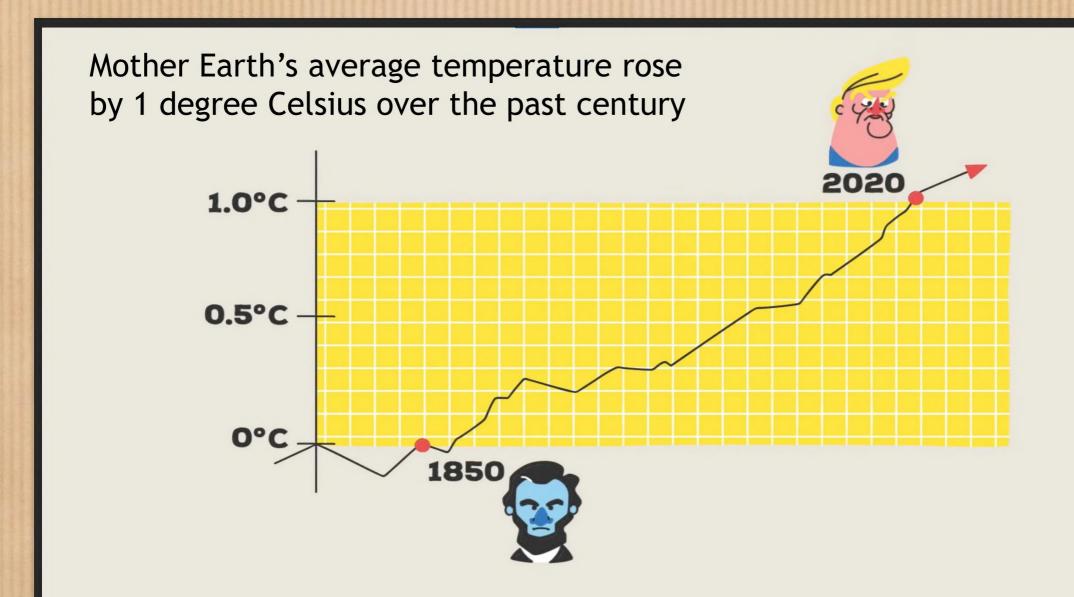
**SEAS** 

THINKING

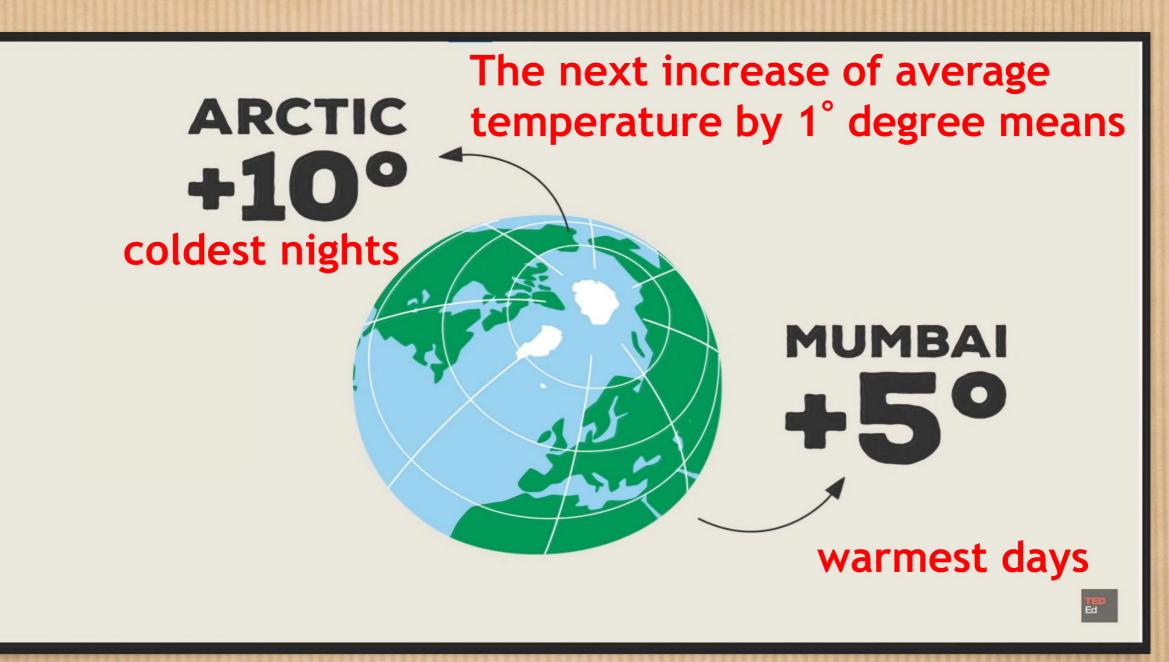


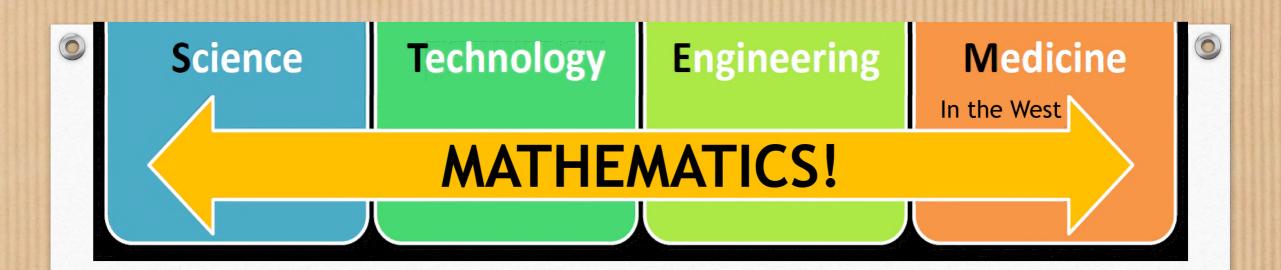












# Science Saves Lives Science Needs Maths The World Needs Podometic™ Bharatiya Maths!



